REMARKS

Claims 1-4, 6-14 and 16-20, as amended, and new claims 21 appear in this application for the Examiner's review and consideration. The claims have been amended to more particularly define the invention. Claims 5 and 15 have been cancelled without prejudice while claim 21 has been added to cover a preferred embodiment that is recited in paragraph 8 of the published specification. Claim 20 has been amended to also cover another preferred embodiment that is recited in paragraph 84 of the published specification. Claim 1 has been amended to recited that the rinsing solution is progressively introduced into the basic polishing solution in order to prevent attack on the wafer surface after polishing stops and before removal of the polishing solution from the wafer surface. Support for this change can be found in paragraphs 59 and 75 of the published specification. As no new matter has been introduced, the claim amendments and additions should be entered at this time. Although applicants fully believe that the prior claims were patentably distinct from the art, to facilitate prosecution, applicants have amended the claims to recite preferred embodiments. These changes and additions should be entered to reduce the issues for appeal by placing the application in condition for allowance.

Claims 1-5, 7 and 16 were rejected over US patent 5,571,373 to Krishna et al. ("Krishna") while claims 6, 8-15 and 17-20 were rejected as being unpatentable over Krishna alone or in view of certain secondary references for the reasons given on pages 2-6 of the action.

Krishna at col. 5 lines 18-57 discloses a polishing step using an ammonia stabilized colloidal silica slurry, followed by treatment with an acidic quench solution to neutralize the alkaline etchant that was applied to the wafer. The quench solution contains a polyether polyol, and it the solution can be applied simultaneously with a water rinse. Accordingly, there can be no anticipation of claim 1 since the chemical attack of the wafer surface due to polishing with a basic pH solution is **not** controllably stopped by progressively introducing a rinsing solution that includes an acidic component. Instead, Krishna discloses a subsequent rinse or quench with an acidic solution. Krishna does not disclose stopping the chemical attack of the wafer surface by progressively introducing a rinsing solution that includes an acidic component. Thus, the anticipation rejection is overcome and should be withdrawn.

As noted in paragraphs 58 and 59 of the published application, the use of high pH polishing solutions for planarizing silicon on insulator wafers has been problematic, in particular when the useful silicon layer is relatively thin, typically on the order of a few micrometers. When polishing is completed, residual chemicals in contact with the surface of the useful layer can attack it and produce small pits or other defects that the polishing was intended to remove. Additional polishing at that point in the process is not possible, since the layer thickness is too thin to support further removal.

The present invention unexpectedly discovered the solution to this problem by progressively introducing an acidic compound into the basic chemicals but during the latter stages of the polishing step so that when the desired polishing level is achieved, the residual chemicals in contact with the thin layer surface have a pH that is reduced and that can be close to neutral so that the attack of the thin layer surface, if any, is less than what can be removed in the finishing (i.e., further rinsing and cleaning) steps.

Furthermore, the claims recite more than the simple contact of an acidic compound to a conventional CMP slurry. When the polishing solution changes too fast from a high pH to a low pH particles or precipitates can be created that must be removed from the surface. As the useful layer in the present invention is very thin, these particles can cause damage or non-uniform polishing of the layer surface. This is why the invention utilizes a progressive pH change from basic to neutral to achieve the desired quality and surface characteristics of the useful layer.

As to the obviousness rejection of claims 8-10 and 18 over Krishna, those claims depend from claim 1, so that the same distinction applies. Thus, this rejection should also be withdrawn.

As to the rejection of claims 6, 14, 15 and 18 over the combination of Krishna and Hall et al. US patent 6,638,145 ("Hall"), Applicants repeat herein and incorporate by reference the comments made in their prior response as to the Hall patent. As noted therein, Hall did not disclose the previous features of claim 1, it certainly does not disclose the features of current claim 1. Furthermore, Hall does not remedy the deficiencies of Krishna as to current claim 1. For those reasons, the combination of Hall and Krishna do not render obvious claims 6, 14, 15 and 18. In view of the above, the obviousness rejection based on Krishna and Hall has been overcome and should be withdrawn.

Claims 11-13 and 19 were rejected as being unpatentable over the combination of Hall with US patent 5,958,298 to Nagoshi et al. ("Nagoshi") for the reasons set forth in the office action. Applicants traverse the rejection.

Nagoshi discloses the use of polyoxyalkylene alkyl ethers in a rinsing process as an essential component (col. 2, line 57 and claim 1) to clean electronic parts (col.1, line 9 and col.2, line 8). However, Nagoshi does not teach that the rinsing step should be progressively introduced to terminate the planarization of the wafer surface. Thus, Nagoshi does not remedy the deficiencies of Hall so that this rejection is overcome and should be withdrawn.

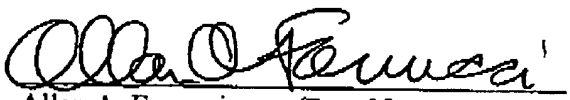
Finally, the rejection of claims 17 and 20 based on the combination of Krishna and Jeong US patent 5,961,377 is traversed for the same reason given above, namely that Jeong does not remedy the deficiencies of Krishna as to claim 1. Since Applicants' polishing step is different, Jeong's disclosure of separate plates does not render claims 17 and 20 unpatentable. New claim 20 recites an embodiment that is further distinguishable in that it is a three stage process where the acidic component is added progressively in the first stage (to obtain a neutral pH upon

completion), a second acidic rinsing stage to further reduce the pH from neutral to acidic followed by a final cleaning stage with neutral pH water to provide the surface with a neutral pH. There is nothing in the cited reference that teaches this combination of steps which, as noted, are necessary for optimum polishing of the thin layer of an SOI wafer. These features are not disclosed by Jeong. Accordingly, this rejection also should be withdrawn.

Accordingly, as all rejections have been overcome, it is believed that the entire application is now in condition for allowance, early notice of which would be appreciated. In the event that the Examiner does not agree that all claims are now allowable, a personal or telephonic interview is respectfully requested to discuss any remaining issues in an effort to expedite the eventual allowance of this application.

Respectfully submitted,

Date: 7/25/05



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